Lock Miter Bit Advice

by Ellis Walentine and Charlie Belden

Tom Pilsbury (Chicago) asked: I used my lock miter bit for the first time yesterday. I followed all the instructions in the MLCS manual and video and took small cuts to sneak up on the full miter. But I gotta tell you I was terrified! That is one scary operation. It felt like the bit wanted to grab the workpiece even with the smallest of cuts. And running the pieces through in the upright position had me shaking with fear of a kickback. I wasn't expecting excellent results my first time and I know the joints will get better the more I practice but if I have to be afraid of losing a finger each time I'm giving up while I'm ahead. So do you more experienced woodworkers have any advice, tips, tricks, or warnings that will help me become better at this operation? All ten of my fingers thank you.

Ellis Walentine: Safety is so important, you don't ever want to be doing anything in the shop that makes you fearful. That says you don't know what you're doing and naturally you are worried that something will go wrong. Further, practicing the wrong approach isn't going to make the approach less dangerous. Hence, it's good to ask, and here is a fine place to ask. Here are a few observations that might help...

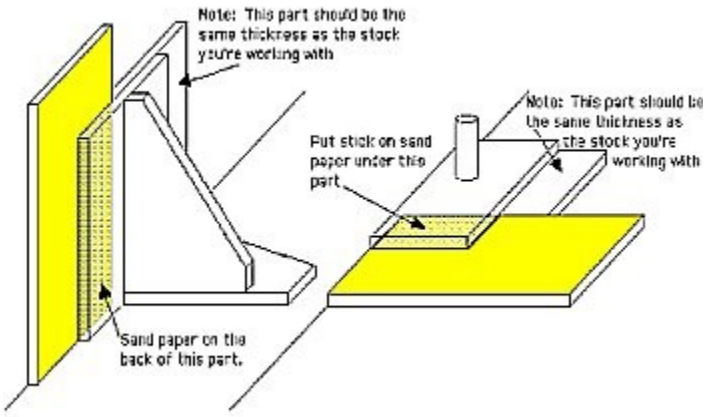
Any large router cutter will remove a lot of wood in a hurry if you let it. That's not always bad, but unless you have a good way to control the workpiece, it can be. Make sure you observe the proper RPM range for the diameter of the cutter you're using. Your lock miter is probably best run at between 10,000 and 13,000 rpm. If you don't have a variable speed router, now might be a good time to get one.

You didn't mention the size of the pieces you're mitering, but unless they're very narrow, you shouldn't have any fears. By all means, make some sturdy featherboards and use them, for both the horizontal and vertical setups. A good featherboard does two important things: it holds the workpiece firmly against the fence or table (or both) so your joint will be perfect, and it acts as a barrier for stray fingers. If the piece is narrow, use a pushblock and a featherboard. I like the pushblock design that looks like a boot. You can use it to direct pressure downward and forward at the same time, and it keeps your hand well above the cutter.

Charlie Belden: Any time you're working with only part of a bit exposed in front of the fence, the first thing you want to do is minimize the gap in the fence. You do **not** want the beginning or end of the stock to get behind the fence.

And when you're using a large router bit—2 to 3" in diameter—you want to use the lowest speed a variable speed routers will spin at—typically 10,000 RPM or so—**not** the 28,000 to 30,000 RPM that are typical of fixed speed routers.

Rather than featherboards to hold the stock down on the table, or upright against the fence, I'd go with two fairly easy jigs to make.



You want

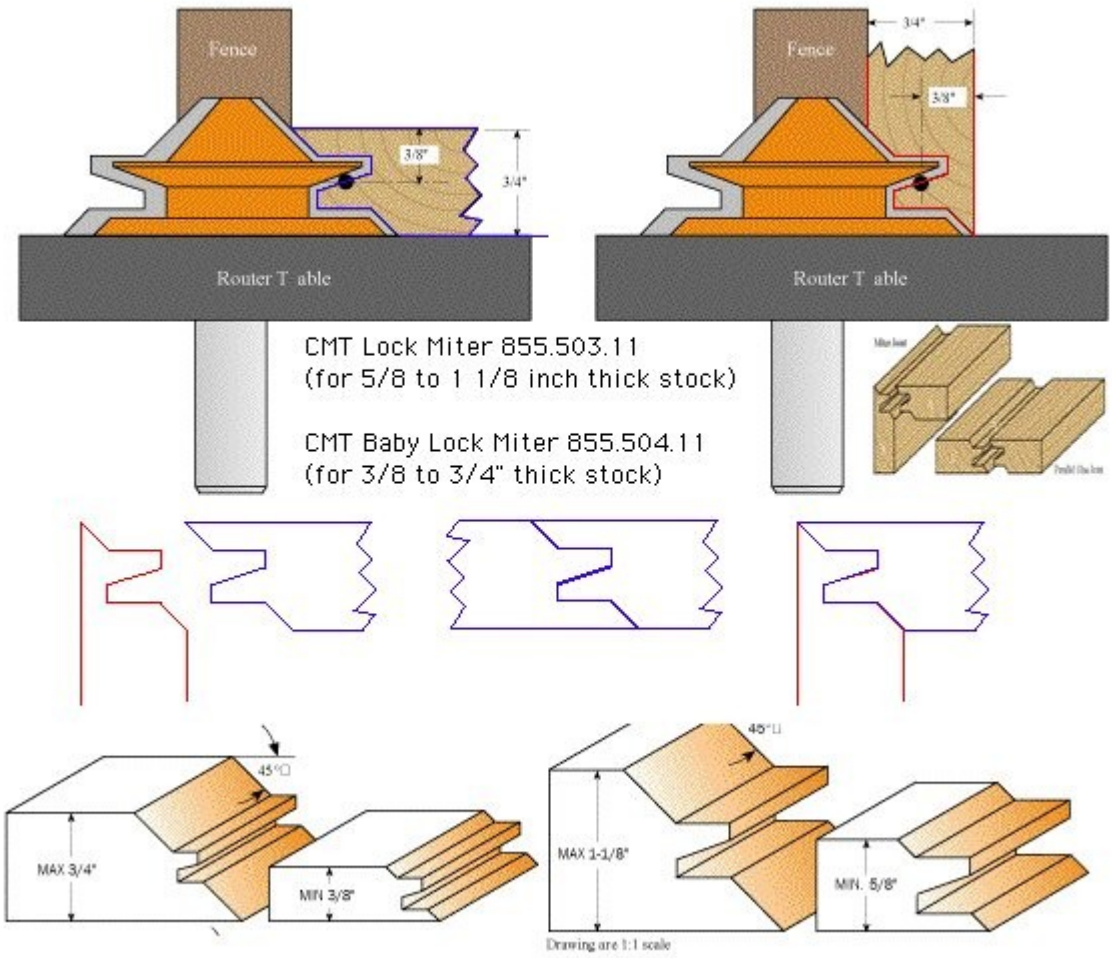
- the part of the part that's supposed to be flat on the router table top actually flat on the router table top…
- and keep it there.
- the part that's supposed to be against the fence stay against the fence.
- a part to be routed vertical to actually be square to the router table top.

That's true whether you're working with a lock miter bit, a raised panel bit or a cope or stick bit.

The lock miter is tricky to set up properly because, ideally, you want a knife edge on the mitered corner's parts. It's really easy to overshoot the "depth of cut" and shorten down the dimension of a part. Also easy to undershoot the setting, and end up with *flats* on the edges of the mitered parts, which will stand out like a sore thumb when the parts are assembled.

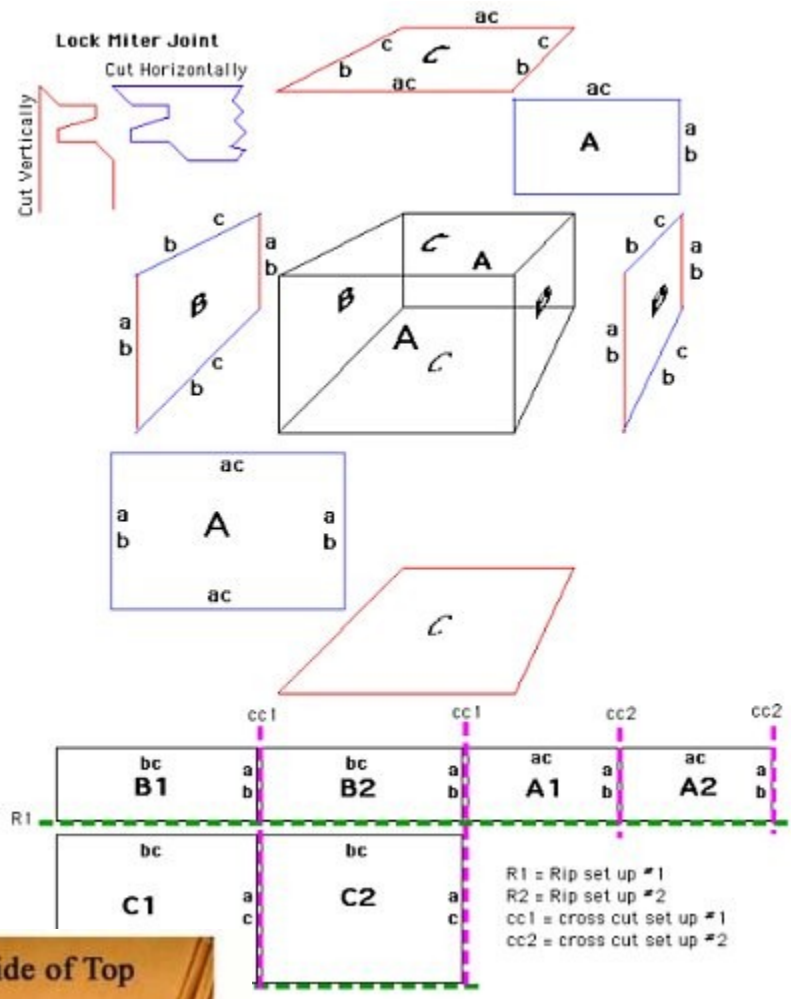
When working with this bit, it's really nice to have a precision positionable fence with replaceable zero clearance inserts in the fence. The JoinTech Cabinet Maker System is such a set up I'm familiar with since I own and use one. You can dial the fence back and forth in .001" "click tactile feedback" increments.

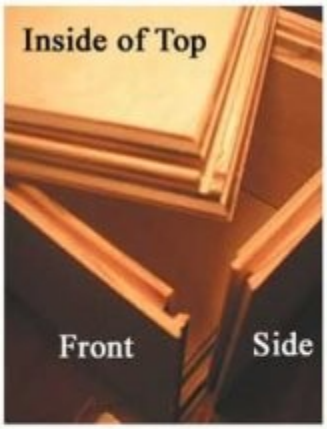
With such a fence system you can sneak up on the depth of cut and once you get it, literally *dial back* so you can do progressive cuts, the last being only a few thousandths of an inch for a nice finish on the cut surface.



Here’s a lock miter router bit and how it works in a router table with a fence.

Setting up the fence/bit height combination that's just right takes a bit of trial and error work but once set up, it's **production time**. Keeping track of the orientation of the parts takes a little effort but easy once you get a system down. It's pretty straight forward for the four corners of the sides of a box. It gets a little trickier when the corners of all six faces have to be lock miter joined. The diagram at right illustrates why. Note that every blue edge must join a red edge and that the top and bottom must have **all** red edges and top and bottom of the sides must bave **all** blue edges to get the thing to all fit together.





Here are photos of an actual box with the joint details. Note after the sides and bottom have been put together, once you put the top in place you won't be able to disassemble the parts without hot gluing a handle onto the top or bottom.

All Lock-Mitered Corners Closed Box